

REMARKS

1. Introduction

Applicants have amended claims 4 and 10, and added new claims 23 and 24. Accordingly, claims 1-24 are presently pending in the above-identified application. Reexamination and reconsideration is hereby respectfully requested.

2. Claim Rejection Under 35 U.S.C. § 112

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph. Applicants have overcome the rejection through appropriate amendment. No new matter has been added. Reconsideration and withdrawal of the rejection is hereby respectfully requested.

3. Interpretation of Elton et al., U.S. 5,036,165

As an initial matter, Applicants understand the Office Action to mean that the Examiner is reading Elton et al. ('165) as disclosing a particular type of electrical cable for use as a winding in a dynamoelectric machine (*i.e.*, the Office Action states that "Elton et al. teach that it is known to use an electrical cable provided with an internal grading layer of semiconducting pyrolyzed glass fiber layer in electrical contact with a cable conductor. Furthermore, Elton et al. teach that it is known to provide a semiconducting layer in the insulation of a conductor and to connect that layer to a fixed potential in order to provide an equipotential surface on the conductor preventing corona discharge around the conductors.

It would have been obvious...to have used the electrical cable as taught by Elton et al. as winding conductors to the stator as disclosed by Brem et al. Since the modification...would provide a cable that prohibits development of corona discharge and maintain a substantially uniform and equal electric potential over the surface of the conductor.")

For the reasons to appear hereinafter, Elton et al. ('165) does not disclose that the electrical cable shown in Figure 1 thereof may be used for windings in a dynamoelectric machine. Rather, the conductor shown in Figure 1 of Elton et al. ('165) is used only for an electrical transmission and distribution cable.

Elton et al. ('165) is a divisional of what is now issued U.S. Patent No. 4,853,565 (Elton et al. ('565)). As stated in column 1, lines 5-9 of Elton et al. ('165), the '565 patent is incorporated by reference in its entirety into Elton et al. ('165). A photocopy of Elton et al. ('565) is attached to this *Amendment and Reply* for the Examiner's convenience.

Therefore, although not reproduced expressly in Elton et al. ('165), the Elton et al. ('165) patent must be construed as if all of the text and drawings in Elton et al. ('565) were expressly included in and reproduced in Elton et al. ('165).

In turn, Elton et al. ('565) disclose generally a semi-conducting layer for insulated electrical conductors in three distinct embodiments. The first embodiment (Figures 1-6) deals with windings in a dynamoelectric machine. With regard to this first embodiment in Elton et al. ('565), the conductors in the dynamoelectric machine are referred to exclusively as "windings" or "bars." The second embodiment (Fig. 7) relates to an electrical cable of the type used for carrying (*i.e.*, transmission of) high voltage. With regard to the second embodiment, the conductor is referred to exclusively as a "cable" and not a "winding" or "bar." The third embodiment (Fig. 8) relates to use of a semiconductor layer disposed on an electrical housing surrounding digital electronic equipment. The conductor in the third embodiment is referred to exclusively as a "housing," and neither a "cable" (for transmission and distribution) nor a "winding" (for use in a dynamoelectric machine). Applicants have carefully reviewed Elton et al. ('565) and have found no variance from the choice of terms used in Elton et al. ('565).

With the foregoing as background, it follows that the mention in Elton et al. ('165) to a "dynamoelectric machine" was in all likelihood inadvertent (*i.e.*, that term was not deleted when the divisional was filed on the "cable" embodiment). In any event, however, why such mention to a "dynamoelectric machine" remains in the Elton et al. ('165) patent is fairly immaterial, since, as described above, the entire contents of the Elton et al. ('565) patent are incorporated by reference into the Elton et al. ('165) patent. When all of the disclosure is taken together, as it must, it is clear that the conductor designated 100 in Elton et al. ('165) relates only to an electrical cable for transmission and distribution of electrical power, and not to a winding for a dynamoelectric machine. Any other interpretation, Applicants submit,

would be contrary to the plain meaning given to the words as defined in the Elton et al. specification.

4. **Claim Rejection Under 35 U.S.C. § 103**

Claims 1-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brem et al. (US 4,638,199) in view of Elton et al. (U.S. 5,036,165). Applicants respectfully traverse this rejection for at least the following reasons: (i) there is no proper basis to support the combination of the references, and (ii) even were it proper to make the combination (which it is not), not all of the recitations in the subject claims would be met.

Concerning the propriety of the combination itself, the Examiner has stated in the Office Action that it would have been obvious to have used the electrical cable of Elton et al. ('165) as a winding in Brem et al. because such a modification according to Elton et al. would provide a cable with an equal potential that prevents corona discharge.

It bears emphasizing that the burden is on the Patent and Trademark Office to establish a *prima facie* case of obviousness when rejecting claims under 35 U.S.C. § 103. When based on a combination of references, the art itself must teach, suggest, or provide an incentive to support the combination:

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, *absent some teaching, suggestion or incentive* supporting the combination. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984).

In Re Geiger, 815 F2d at 688, 2 USPQ2d at 1278 (Fed. Cir. 1987) (emphasis added). For the reasons to appear hereinafter, the Office has not met the above-quoted standard for establishing a *prima facie* case.

It should also be noted that the Examiner must take into account factors set forth in Graham v. John Deere, Co., 373 U.S. 1, 17-18, 148 U.S.P.Q. 459, namely the scope and content of the prior art; the level of ordinary skill; the differences between the claimed invention and the prior art; and secondary considerations including commercial success, long

felt but unresolved need and unexpected results (*see* Richard Ruiz and Foundation Anchoring Systems, Inc. v. A.B. Chance Company, 99-1577-1563 CAFC).

Here a Graham analysis would suggest that the scope and content of the prior art shows no motivation to employ a high voltage cable in a rotating machine. In Ruiz above the CAFC emphasized that a rigorous application of the requirement for showing of motivation is the best defense against the powerful attraction of a hindsight based obviousness analysis.

It is not sufficient to establish obviousness that separate elements of the invention can be found, absent some suggestion to combine such elements. The Examiner must focus on the invention as a whole, not the obviousness of substitutions. Why is it apparent to use the cable in Elton et al. ('165) as the winding in a machine? Elton et al. ('165) deals only with a transmission and distribution cable and Elton et al. ('565) from which ('165) derives describes conventional rigid bar type windings and does not suggest that there is any interchangeability between rigid windings and cables. Indeed Elton et al. ('565) implicitly suggest the opposite namely that machines and cables are different. The reasons to combine must be found in the prior art, the knowledge of those skilled in the art or from the nature of the problem to be solved leading the inventors to look to the references related to possible solutions. *See* Ruiz.

In the present case, the references do not suggest the combination; the knowledge of those skilled in the art does not suggest a combination; and the nature of the problem to be solved does not suggest the combination notwithstanding the Examiner's assertion that Elton et al. ('165) would provide a cable without corona discharge and equal potential.

The level of ordinary skill in the art must likewise be considered. For example, factors that may be considered in determining the ordinary level of skill in the art include the types of problems encountered; the prior art solutions to those problems; the rapidity with which innovations are made; the sophistication of the technology; and the education level of active workers in the field.

Not all such factors need be necessary in every case. However, in the present case it can be asserted that the problems encountered by machine designers and cable designers are entirely different. Machines operate at relatively low voltage and high current, and transmission and distribution cable engineers design cables for operating at high voltage and

relatively low current. The prior art solutions to problems in the machine area deal with problems associated with high currents, high magnetic fields and high heat, whereas cable designers are concerned with high voltage and thermal considerations are less, if not, unimportant.

Certainly the sophistication of the technology and the educational levels of the workers in the field is quite diverse when it comes to high power electric machinery and transmission and distribution cables. These various technologies have been under development for over a hundred years and there is a great deal of nuance and sophistication involved in designing each of these types of systems.

Finally, secondary considerations are important. Especially in the present invention where the inventors were faced with an extremely high level of skepticism from those individuals wedded to the conventional technology. It should be understood that those involved with power generation systems and those involved in distribution transmission systems operate in conservative environments. The systems must be workable and reliable, and solutions are based upon incremental changes not radical speculation. Those of ordinary skill in the art in each area are skeptical and conservative. Nevertheless, following a difficult period where it was necessary to disprove the skeptics, the invention has been accepted and is in commercial operation. This is quite remarkable. It is fair to say also that there is a connection between the commercial success that the invention has enjoyed and the claimed invention, inasmuch as for the first time practical and commercial high voltage generation has been achieved by virtue of the invention.

No Disclosure of Cable 100 as a "Winding" in a Dynamoelectric Machine

As discussed above, Applicants respectfully contend that the starting point in the Examiner's train of reasoning as stated in the Office Action (*i.e.*, that "Brem et al. disclose the *claimed invention* except . . .") is incorrect. Accordingly, the remainder of the reasoning set forth in the Office Action in support of the combination therefore fails. Applicants cannot see nor has the Examiner stated how one would otherwise arrive at the basic starting point (*i.e.*, that cable 100 is used as a "winding") absent an express disclosure in Elton et al. ('165). While Applicants contend that there is no logic to support using the transmission cable of

Elton et al. ('165) as a "winding" in a high volume rotary machine, it is not incumbent on Applicants to try to come up with such reasoning – essentially a case of arguing against themselves. Such burden is on the Patent and Trademark Office.

Notwithstanding the foregoing, Applicants point out that the Elton et al. ('565) patent (incorporated by reference) fails to describe the use of cable 100 as a winding in a high volume rotary machine even as a remote possibility. This is a particularly substantial omission, particularly when a dynamoelectric machine was described elsewhere in the patent.

No Motivation to Combine

Notwithstanding the foregoing, should the Examiner disagree with Applicants' interpretation of Elton et al. ('165) (through incorporation of Elton et al. ('565)), Applicants offer, in order to achieve compact prosecution, the following in support of patentability. The Examiner has stated that the reason it would be obvious to modify Brem et al. with the teachings of Elton et al. ('165) is that it would "provide a cable that prohibits development of corona discharge and maintain substantially uniform equal potential". Brem et al. relates to an arrangement of laminated plates which need not be elaborately machined in order to eliminate lamination shorts (abstract). Brem et al. does not suggest the possibility of improving performance by changing the winding, that is, by substituting the cable of Elton et al. ('165) for the conventional winding in Brem et al. Indeed, Brem et al. is adapted to employ such a conventional winding as illustrated by the rectangular slots. Brem et al. teach that the baseline structure is a prior art low voltage machine which is improved by means of non-magnetic axial clamp. Perhaps the reasoning stated in the Office Action would have some force if the structure in Brem et al. exhibited a problem that could benefit from the solution of Elton et al. ('165). However, such is not the case. Whatever else can be argued to be taught by the obviously inadvertent mention of "dynamoelectric machines," it is beyond disagreement that Elton et al. ('165) is clearly *silent* as to how such a cable 100 could be used as a "winding" in a stator of such a dynamoelectric machine. Given the wide variety of ways a stator of a dynamoelectric machine may be organized, a fair reading of Elton et al. ('165) is that it does not teach any particular stator winding arrangement, much less the type suggested by the Examiner, namely a winding formed of a cable. For a proper basis to exist for

Brady
Improvement
Not
the comparison?

Corona Discharge
is a known
problem

applying Elton et al. ('165) to Brem et al., it must disclose or suggest a suitable problem to be solved, or an advantage to be gained. The reference to be modified is Brem et al. Brem et al. does not disclose a need for the improvement of Elton et al. ('165). Accordingly, adding the teaching does nothing but increase cost, and may even adversely affect function.

In summation, the reasoning set forth in the Office Action assumes, without support, that a problem is disclosed in Brem et al. or, that a problem can be inferred from the structure disclosed in Brem et al. such that it would make sense to apply the solution set forth in Elton et al. ('165). As discussed above, whatever can or cannot be said of the mention of a dynamoelectric machine in Brem et al., it remains silent as to how a cable 100 could be used as a "winding" generally, and particularly of the type that could improve the structure of Brem et al. Reading any more out of Elton et al. ('165) is pure speculation, and is unsupported.

Accordingly, since there is no teaching, suggestion, or incentive in the art that supports the modification, Applicants respectfully submit that the Office has impermissibly used Applicants' own disclosure to hunt through the prior art for needed elements and combine them, as claimed.

In addition, claims 10, 23 and 24 recite, in-part, a "flexible" conductor. Applicants respectfully submit that the cable disclosed in Elton et al. ('165) is quite inflexible. This is because the pyrolized glass fiber layer is stiff and brittle. This is more than just an academic difference relative to Applicants' invention. Because of this stiffness and brittleness, the cable of Elton et al. ('165) could not in-fact be used as a winding in a dynamoelectric machine. The Elton et al. ('165) cable would crack, producing partial discharge paths through the pyrolized glass fiber layers. In addition, the brittleness of the cable of Elton et al. ('165) is fatal. The inability of such a cable to withstand the high mechanical forces and vibration expected to occur in a high voltage rotating electric machine would lead to partial discharge as described above and possibly failure.

The foregoing paragraphs focused on particular language of claim 1 that would not be met, even assuming it were proper to combine Brem et al. and Elton et al. ('165). Concerning the differences between the prior art and the claims at issue, it is essential to view the claims in issue as the invention as a whole, as required by 35 U.S.C. § 103. In this view,

it is therefore impermissible to ignore the advantages, properties, utilities and unexpected results flowing from the claimed invention; they are part of the invention as a whole. In Re Chupp, 816 F2d 643, 2 USPQ2d 1437 (Fed. Cir. 1987). There are multiple advantages, as stated in Applicants' specification, one advantage of the claimed invention is that the voltage of the machine can be increased to such levels that it can be connected directly to the power network without an intermediate transformer (page 7, lines 26-28). Applicants cannot see, nor has the Office suggested, how such advantages can be achieved by the combination of Brem et al., and Elton et al. ('165).

For at least the foregoing reasons, it is respectfully submitted that claim 1 defines novel and non-obvious subject matter over the art of record. Applicants therefore respectfully request that the rejection be reconsidered and withdrawn.

Dependent claims 2, 3 and 23 include all of the limitations of base claim 1; claims 5-9 and 24 include all of the limitations of base claim 4; and claims 11-22 include all of the limitations of base claim 10. Therefore, at least for the same reasons set forth above, the rejection of the dependent claims is improper, and Applicants respectfully request that it be reconsidered and withdrawn.

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6. Conclusion

For the foregoing reasons, all presently pending claims are now believed to be in a condition for allowance. Early notice of the same is hereby respectfully requested.

Respectfully submitted,

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Version with Markings to Show Changes Made

4. (Twice Amended) A rotating electric machine [adapted to be connected] for connection to a cooling circuit for circulating coolant therethrough, comprising a stator wound with a high-voltage cable and, the stator being divided into sectors and having corresponding stator teeth extending radially inwards from an outer yoke portion and axial ends, wherein at least one of said stator teeth in a sector having at least one axially-running cooling duct for connection to the cooling circuit for circulating coolant and clamping means for axially compressing the stator, wherein the axially-running cooling tube is connected at least at one end of the stator to the clamping means

10. (Twice Amended) A rotating electric machine comprising a wound stator having opposite ends formed of stator laminations and have stator teeth extending radially inwards from an outer yoke portion and a flexible winding comprising a first semiconducting layer, an insulating layer around the first layer, and a second semiconducting layer around the insulating layer, and an axially running clamping device electrically insulated from the stator laminations connected at least at one end of the stator for imposing axial compression to predetermined level on the stator.